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# Momentum, Heat, and Mass Transfer

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**MOMENTUM,  
HEAT, AND  
MASS TRANSFER**

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**Removal of artificial joints - with focussed ultrasonic head to loosen cement around joint support**

Patent Assignee: SIEMENS AG (SIEI )

Inventor: HASSLER D

Number of Countries: 001 Number of Patents: 001

**Patent Family:**

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 4041063	A	19920625	DE 4041063	A	19901220	199227 B

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DE 4041063	A	17	A61F-002/46		

**Abstract (Basic): DE 4041063 A**

The ultrasonic head (10,9) has a shaped end to fit over the joint (3) and to direct ultrasonic vibrations through the joint and into the current which fixes the joint into the bone. The ultrasonic vibration is selected to destroy the cement with no damage to the surrounding bone. The joint can then be removed and replaced.

The piezoelectric transducer (10) provides the vibrations which are focussed by a shaped connecting element. The focus of the vibrations is the centre of the joint and the vibrations in the cement are shear waves. Magnetostrictive vibration generators can also be used.

USE/ADVANTAGE - Safe removal of joints, no excessive force required, minimum damage risk to bones.

Dwg.1/9

Title Terms: REMOVE; ARTIFICIAL; JOINT; FOCUS; ULTRASONIC; HEAD; LOOSE; CEMENT; JOINT; SUPPORT

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